Short Communication

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Pseudomonas stutzeri-an opportunistic pathogen

Abstract

Pseudomonas stutzeri is a Gram-negative bacterium that has been accounted for as a causative specialist of certain diseases. It has been accounted as a cause of pneumonia, meningitis, visual disease, osteomyelitis and joint diseases. Thus, this species could be considered an opportunistic but rare pathogen. In addition, possess an extensive variety of resistance mechanisms against diverse group of antibiotics

Keywords: 16S rRNA, DNA-rRNA hybridization, organotrophically, genomic, anaerobic

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Introduction

Pseudomonas stutzeri is a nonfluorescent denitrifying bacterium broadly dispersed in the environment, and has been isolated as an opportunistic pathogen from humans.[1] It was first described by Burri and Stutzer in 1895.[2] Later, in 1952 characterization of its phenotypic traits and taxonomic position as *Pseudomonas stutzeri* by Lehmann and Neumann.[3] The sequence similarity of the rRNAs, exhibited at first by DNA-rRNA hybridization, show the authenticity of the incorporation of *Pseudomonas stutzeri* in the family *Pseudomonas.*[4] *Pseudomonas stutzeri* are identified as denitrifiers in the environment, exhibiting nutritional versatility by utilizing diverse carbon source such starch, maltose, and ethylene glycol.[5,6] Varieties in DNA successions led into various genomic variations with in the species (genomovars) that are phylogenetically related.[7] A few strains stand out due to explicit metabolic properties such as denitrification, aromatic complexes degradation, nitrogen fixation, biotransformation etc.[8] *Pseudomonas stutzeri* is presently perceived as having a place with the class Gamma proteobacteria and phylogenetic investigations of its 16S rRNA successions and other phylogenetic markers show that they have a place with similar branch, along with related with in the genus *Pseudomonas.*[9,10] *Pseudomonas stutzeri* are rod shaped bacteria approximately1 to 3 µm long and 0.5 µm in width, and have a solitary polar flagellum.[11] Phenotypic characteristics of the class incorporate a negative Gram stain, positive catalase and oxidase tests, and a stringently respiratory metabolism.[12] They can develop on starch and maltose and have a negative response in arginine dihydrolase and glycogen hydrolysis tests.[13] GC content of their genomic DNA lies somewhere in the range of 60 and 66 mol% and DNA hybridizations empower somewhere around 17 genomic gatherings, called genomovars, to be recognized.[14] Individuals from the equivalent genomovar have over 70% comparability in DNA hybridizations. Individuals from various genomovars for the most part have comparability values beneath half.[15,16] The astounding physiological and biochemical variety and adaptability of *Pseudomonas stutzeri* is shown by its ability to develop organotrophically through mineralizing or debasing a large number of natural substrates.[17] its capacity to develop anaerobically, involving different terminal electron acceptors in a rigorously oxidative digestion involving inorganic substrates for acquiring extra energy.[18] In addition, *Pseudomonas stutzeri* displayed resistance towards heavy metals and takes part in nutritional cycles of including C, N, S, and P.[19] *Pseudomonas stutzeri* is well adaptable to grow under different temperatures thus it is a significant physiological trademark when the natural surroundings that can be colonized by this species are thought of.[20] It gives new hereditary varieties to colonizing new environments or for possessing new natural specialties, in any event, when the populace is basically clonal.[21]

For a about 15-year time span after 1956, a few reports depicted the isolation of *Pseudomonas stutzeri* from clinical and neurotic samples.[22] In any case, there was no unmistakable relationship of this species with pathogenesis cycle.[23] However later, a couple of instances of *Pseudomonas stutzeri* associated diseases have been accounted for in relationship with bacteremia/septicemia, bone/joint infection, osteomyelitis, joint inflammation, endocarditis, endophthalmitis, meningitis, pneumonia or potentially empyema, ecthyma gangrenosum etc.[24,25] Thus, *Pseudomonas stutzeri* is ubiquitous in hospital environments and this species could be considered an opportunistic but rare pathogen.[26] In addition, it was found to be sensitive towards antibiotics because of its low occurrence in clinical environments and, consequently, its lower exposure to antibiotics.[27] Regardless of these outcomes, when bacterial secludes were obtained from immunosuppressed patients, no massive contrasts in anti-infection vulnerability between *Pseudomonas aeruginosa* and other *Pseudomonas* spp., including *Pseudomonas stutzeri*, were distinguished.[28] Strangely, except for fluoroquinolones, resistance *Pseudomonas stutzeri* strains have been confined for practically all antibiotic families.[29] This recommends that this species possess an extensive variety of antibiotic resistance mechanisms.[30] Such as changes in external layer proteins and lipopolysaccharide profiles[31] and the presence of β-lactamases that hydrolyze regular and semisynthetic penicillins, wide range "β-lactamase-stable" cephalosporins, and monobactams with comparative rates.[32]

Conclusion

Thus, *Pseudomonas stutzeri* is a denitrifying bacterium broadly dispersed in the environment, and has been isolated as an opportunistic pathogen from humans. In addition, also displays resistance against diverse antibiotics

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Conflicts of interest

The authors state that there is no conflict of interest.

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